

5000V DIGITAL/ANALOG & GRAPHICAL MEGOHMMETER

Models 5050, 5060 & 5070



- Test voltage combinations of 500V, 1000V, 2500V, 5000V and selectable from 40 to 5100V
- Measures insulation resistance from 30k Ω to 10T Ω
- Automatic calculation and measurement of DAR, PI and DD ratios, Capacitance, Leakage Current and more
- Automatic discharge and display of discharge voltage
- Programmable test run times and PI ratio times
- RS-232 interface with software for configuration, test control and data reporting (Models 5060 & 5070)
- Remote operation and storage on PC (Models 5060 & 5070)
- AC powered with rechargeable battery
- Programmable step voltages (Model 5070)
- Alphanumeric or graphic display of results (Model 5070)

FEATURES

Models 5050, 5060 & 5070

- True Megohmmeter®
- Test voltage combinations of 500V, 1000V, 2500V and 5000V
- Insulation measurements from 30k Ω to 10,000G Ω (10T Ω)
- Selectable and programmable test voltage (40 to 5100V)
- Automatic calculation of DAR, PI and DD ratios
- Direct measurement and display of Capacitance and Leakage Current
- Display resistance, test voltage and run time
- Programmable test run times and PI ratio times
- Smooth and Alarm functions
- Automatic test inhibition (if live sample >25V)
- Automatic discharge and display of discharge voltage
- Large dual-display with time, voltage and measurements shown (Models 5050 and 5060)
- Graphic and digital display of test voltage, resistance and more (Model 5070)
- Bright blue electroluminescent backlight
- Programmable test voltage lock-out
- Programmable alarm setting
- Auto power-down when not in use
- AC or DC powered with rechargeable NiMH batteries
- Rugged, weatherproof field case
- Designed and built to IEC safety standards
- EN 61010-1, 1000V Cat. III

The Models 5050, 5060 and 5070, the latest design in 5000V Megohmmeters, are the most innovative products in their class on the market today. The features and functions incorporated in this product family are the results of many years of analyzing how megohmmeters are used in everyday applications. The most advanced technology available has been applied to automate and facilitate the testing process for these applications.

Many features incorporated in the Models 5050, 5060 and 5070 (not found in any other megohmmeter on the market today) include automatic calculation and presentation of the Dielectric Absorption Ratio (DAR), Polarization Index (PI) and Dielectric Discharge (DD). The PI ratio times are also user defined. These new advanced megohmmeters display the test voltage, insulation resistance and the leakage current during and after the test. Capacitance of the sample and discharge voltage present at the test leads is displayed at the conclusion of the test. The Model 5070 is the only megohmmeter to offer both a graphical plot of the test right on the instrument, as well as a digital presentation of the test results. The Model 5070 also offers the ability to program up to three step voltage profiles, each containing up to five steps.

The Models 5050, 5060 and 5070 are designed with the highest level of safety features built in. All units are packaged in a rugged insulated case. They incorporate test inhibit capabilities which will not allow test voltages to be generated if a live sample is detected. The test terminals are recessed to ensure operating safety. The test leads, rated for 5000V for both testing and measurement, are the only truly safety approved 5000V leads on the market today. All three models can be operated from an internal rechargeable battery system or from AC line power.

The Models 5060 and 5070 offer additional functionality in that an RS-232 port provides the ability to configure the units from a PC and run the test from the PC. Automatic documentation of test conditions and test results eliminates the need for writing down information. Test reports can be generated directly from the instrument to a printer or through the PC using the DataView® graphing and analysis software provided.

The list of features, functions and benefits goes on and on. If you are looking for a truly advanced 5000V Megohmmeter, the AEMC® Models 5050, 5060 and 5070 are the best in class and available at an affordable price.



Models 5060 and 5070 include these additional features:

- RS-232 interface for direct printing of results (serial or parallel output)
- 128kB memory for storing extensive field test data
- Configure instrument and run tests from a PC
- Includes DataView® software for data storage, analysis and report generation

Model 5070 includes these additional features:

- Selectable and programmable test voltage (40 to 5100V) – three can be stored
- Automatic step voltage with programmable step and dwell times – three profiles can be stored, each with up to five steps
- Programmable temperature compensation of resistance readings
- Large graphic display with five line alphanumeric display and graph of all test results



The Models 5060 and 5070 are easily configured and run directly from a PC.

Key Functions - All Models



Smooth Function – This function is very useful when the readings on the display are unstable and hard to read. It applies a digital filter to the displayed readings to smooth out the presentation. It does not effect the measurement or recording of data.



Alarm Function – Allows for the setting of a low limit resistance value for each test voltage, below which a buzzer will sound alerting you to a problem condition.



Selectable Voltage – Provides the flexibility to program an exact voltage for a specific test to any voltage from 40 to 5100V in 10V increments. The Model 5070 also allows for storage of three different voltage selections.



Test Voltage Lock-out – Gives the flexibility to limit the maximum output test voltage to any value from 40 to 5100V to protect delicate equipment from accidental exposure to excessive test voltages.



Timer Function – Program a test run time from one minute to 50 hours.

Key Functions - Models 5060 & 5070

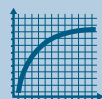


Record Function – provides the option to automatically store the data from a timed test at programmable intervals or to store the results of the test manually at the push of a button at the end of the test.



Print Function – Provides a direct print out to a printer of test results in a predefined format.

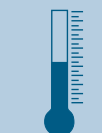
Key Functions - Model 5070



Graph Function – Provides a graphic representation of a time test on the display of the Model 5070 of insulation resistance vs. time. If the step voltage mode is selected, the step voltage is also shown graphically.



Ramp Function – Allows programming of three different ramp test profiles, each containing up to five voltage steps between 40 and 5100V and time per step of up to 10 hours.



Temperature Function – Provides the ability to display insulation resistance temperature corrected to a specific reference temperature.

APPLICATIONS

- Test insulation on cables, transformers, motors, generators, insulators and wiring installations
- High resistance or absorption tests
- Spot reading tests
- Timed resistance measurements
- Dielectric Absorption Ratio (DAR) and Polarization Index (PI) tests
- Multi-layer insulation testing (Dielectric Discharge)
- Test old or water damaged installations over long time runs
- Motor insulation resistance measurements
- Computer controlled production line testing
- Predictive maintenance by storing results in PC for trend analysis
- User selectable voltage testing to provide application specific testing



Model 5060 checking insulation resistance on feed cables to a three-phase motor.



Model 5070 performing insulation test on a generator.

Insulation can be subject to slow, gradual degradation over long periods of time, as well as sudden damage. The effects of moisture, dirt, corrosion, chemical penetration and even vibration can cause degradation of insulation. The effects of this degradation can easily be documented by using the automatic Polarization Index test feature standard on all models. Comparing the results over time will provide valuable information for preventative maintenance measures.

SPECIFICATIONS

MODELS	5050	5060	5070
INSULATION TESTS			
Test Voltage/Range	500V 1000V 2500V 5000V	30kΩ to 2000GΩ (2TΩ) 100kΩ to 4000GΩ (4TΩ) 100kΩ to 10,000GΩ (10TΩ) 300kΩ to 10,000GΩ (10TΩ)	30kΩ to 2000GΩ (2TΩ) 100kΩ to 4000GΩ (4TΩ) 100kΩ to 10,000GΩ (10TΩ) 300kΩ to 10,000GΩ (10TΩ)
User Selectable Test Voltage	Programmable: 40 to 1000V: 10V increments; 1000 to 5100V: 100V increments	Programmable: 40 to 1000V: 10V increments; 1000 to 5100V: 100V increments	Programmable: 40 to 1000V: 10V increments; 1000 to 5100V: 100V increments Three test voltages can be stored.
Short Circuit Current	<1.6mA ± 5%	<1.6mA ± 5%	<1.6mA ± 5%
Accuracy	1kΩ to 40GΩ 40GΩ to 10TΩ	±5% of Reading ± 3cts ±15% of Reading ± 10cts	±5% of Reading ± 3cts ±15% of Reading ± 10cts
DAR (1 min/30 sec) ⁽¹⁾	0.02 to 50.00	0.02 to 50.00	0.02 to 50.00
PI (10 min/1 min & user programmable)	0.02 to 50.00	0.02 to 50.00	0.02 to 50.00
DD $\left(\frac{\text{Current after 1 min}}{\text{test voltage} \times \text{capacitance}} \right)$	0.02 to 50.00	0.02 to 50.00	0.02 to 50.00
Capacitance Check	0.005 to 49.99µF Max resolution 1nF	0.005 to 49.99µF Max resolution 1nF	0.005 to 49.99µF Max resolution 1nF
Leakage Current Measurement	0.00nA to 3mA Max resolution 1pA	0.00nA to 3mA Max resolution 1pA	0.00nA to 3mA Max resolution 1pA
Programmable Run Time R(t)	1 to 60 min	1 to 60 min	1 min to 49 hrs 59 min
Smooth Function (user selectable)	Digital filtering stabilizes display readings	Digital filtering stabilizes display readings	Digital filtering stabilizes display readings
Automatic Step Voltage	–	–	3 profiles, each containing 5 steps programmable from 40 to 5100V. Dwell time programmable from 1 min to 10 hrs per step. Maximum total time for 5 steps is 59 hrs 59 min
Temperature Correction	–	–	Operator programmable reference temperature and device under test temperature with automatic temperature correction of resistance
Discharge After Test	Automatic	Automatic	Automatic
Discharge Voltage Display	Yes	Yes	Yes
Voltage Test/Safety Check	0 to 1000VAC/DC (16 to 420Hz), 1V Resolution	0 to 1000VAC/DC (16 to 420Hz), 1V Resolution	0 to 1000VAC/DC (16 to 420Hz), 1V Resolution
Voltage Warning Indicator	Yes >25V	Yes >25V	Yes >25V
Test Inhibition ⁽²⁾	Yes >25V	Yes >25V	Yes >25V
Guard Terminal	Yes – adjustable from 25 to 1000V depending on test voltage range in use	Yes – adjustable from 25 to 1000V depending on test voltage range in use	Yes – adjustable from 25 to 1000V depending on test voltage range in use
DISPLAY			
Backlight	Blue, Electroluminescent	Blue, Electroluminescent	Blue, Electroluminescent
Display Size	4 x 2.25" (102 x 57mm)	4 x 2.25" (102 x 57mm)	3.75 x 3" (93 x 75mm)
Display	Digital: Two 4000-count displays; Analog bargraph: 33-segments	Digital: Two 4000-count displays; Analog bargraph: 33-segments	Graphical: 320 x 240 resolution
GENERAL			
Power Source	Eight NiMH rechargeable batteries – Line power: 85 to 256VAC (50/60Hz)		
Dimensions	10.63 x 9.84 x 7.09" (270 x 250 x 180mm)		
Weight	9.5 lbs (4.3kg)		
Protection Index	IP53		
OTHER SPECIFICATIONS			
Report Print Out Direct to Printer	No	Yes – preset format	Yes – preset format
Storage of Readings over Time R(t)	4kB memory	128kB memory	128kB memory
Programmable Reading Intervals	5 sec to 15 min	5 sec to 15 min	5 sec to 15 min
Test Voltage Display	Yes	Yes	Yes
Elapsed Test Time Display	Yes	Yes	Yes
Real Time/Date Display	No	Yes	Yes
Test Voltage Lock-out	User programmed	User programmed	User programmed
Storage of Test Results	20 Readings	Stores over 1500 test results	Stores over 1500 test results
Communication Port	–	RS-232	RS-232
PC Software/Report Generation	No	Yes, DataView® (included)	Yes, DataView® (included)
PC Operation of Megohmmeter	No	Yes	Yes
SAFETY			
Safety Rating	EN 61010-1, 1000V Cat. III		
Double Insulation 	Yes		
CE Mark	Yes		

⁽¹⁾DAR times are programmable in the Model 5070

⁽²⁾Inhibit voltage is selectable at 3, 10 or 20% of test voltage

FUNCTIONAL DISPLAYS

Models 5050 & 5060



Insulation Resistance Measurement displayed throughout the test. Time or test voltage can be displayed at the press of a button.



Automatic calculation and display of DAR ratio.



Automatic calculation and display of PI Ratio.



Automatic calculation and display of DD Ratio on request the conclusion of the test.



Capacitance Measurement from 1nF to 50μF displayed at the conclusion of each test.



Leakage Current Measurement from 1pA to 3000μA displayed during the test.



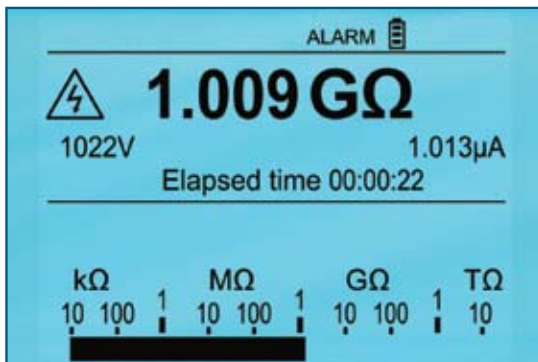
User selectable Test Voltage programming from 40 to 5100V.



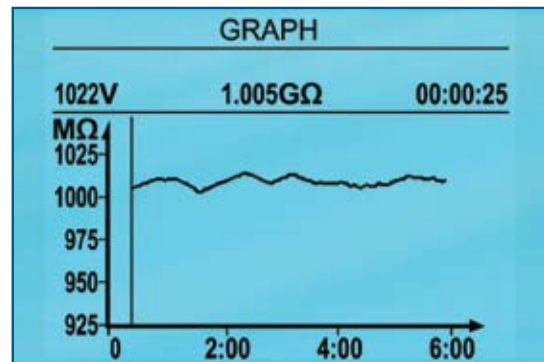
Memory Function for Data Storage up to 99 objects (files), each containing up to 99 test results; the maximum number of records stored is 1500.

FUNCTIONAL DISPLAYS

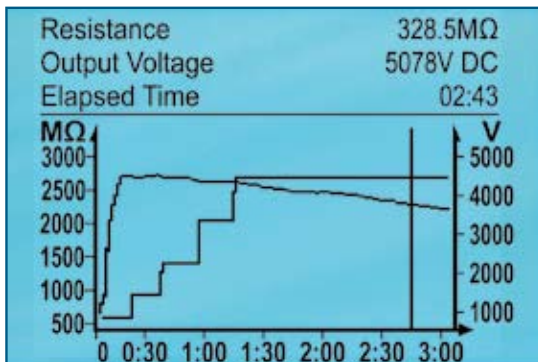
Model 5070



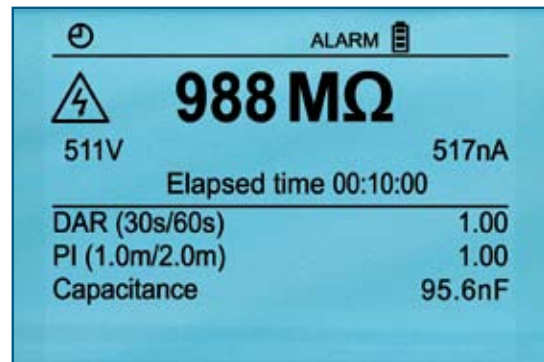
Alphanumeric and analog bargraph displays of Insulation Resistance, Leakage Current and Test Voltage during the test



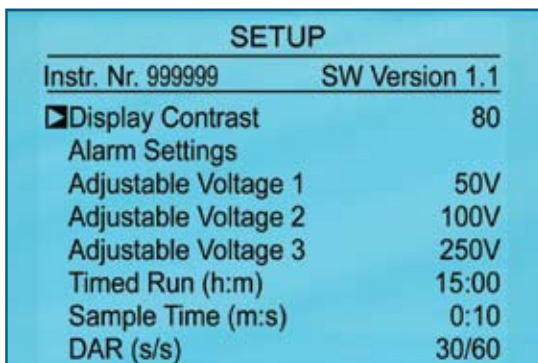
Insulation Resistance measurement graphically displayed at the completion of the test at the push of a button



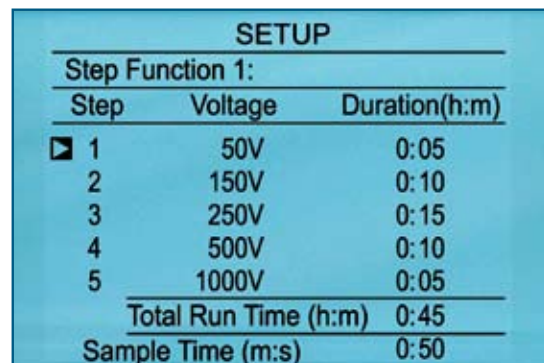
Move the vertical cursor to see Resistance, Output Voltage and Elapsed Time values at the cursor position



Display of test results at the conclusion of the test



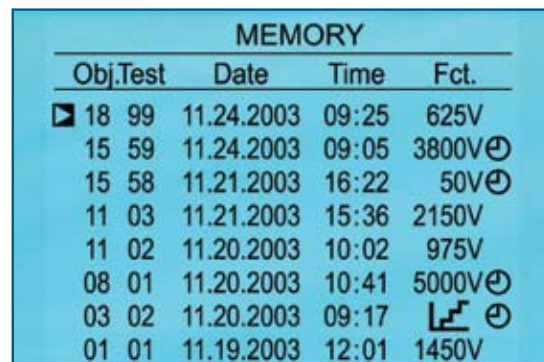
Typical display in Setup mode showing some of the parameters that are user programmable



Typical setup screen for the Step Voltage function



Step Voltage start screen shows start and ending test voltage, test run time and some of the parameters to be monitored



Typical screen showing data recalled from stored memory; each test stored can be reviewed on screen both graphically and alphanumerically.

SOFTWARE

DataView®

Data Analysis and Reporting Software for Models 5060 & 5070

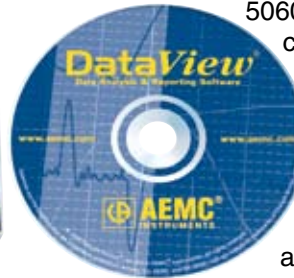
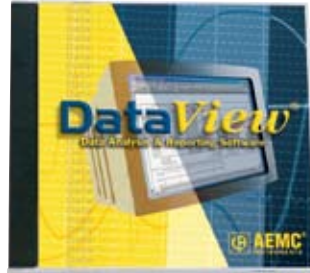
Configure all functions of the Megohmmeter Models 5060 & 5070

Print reports of all test results

- Select test voltage and run tests from your computer with a simple click and execute process
- Capture and display data in real time
- Retrieve data from the instrument's memory:
 - Over 1500 insulation resistance measurements
- Display DAR, PI and DD ratios
- Plot graphs of manual and timed tests
- Include your analysis in the comments section with the report
- Store a library of setups for different applications
- Certification of results through report generation

The DataView® Software provides a convenient way to configure and control Megohmmeter tests from your computer.

Through the use of clear and easy-to-use dialog boxes, all functions of the Models 5060 and 5070 can be configured and tests can be initiated. Results can be displayed in real time and stored in your PC. Reports may be printed along with the operator's comments and analysis.



DataView® is included with the Models 5060 and 5070.

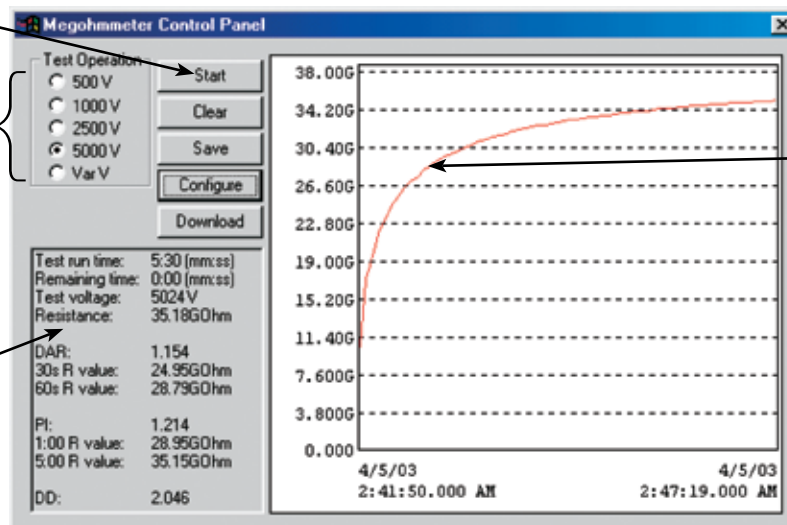


Set up all functions from one clear and easy-to-use dialog box.

One button operation starts test and graphs results

Test voltage selection

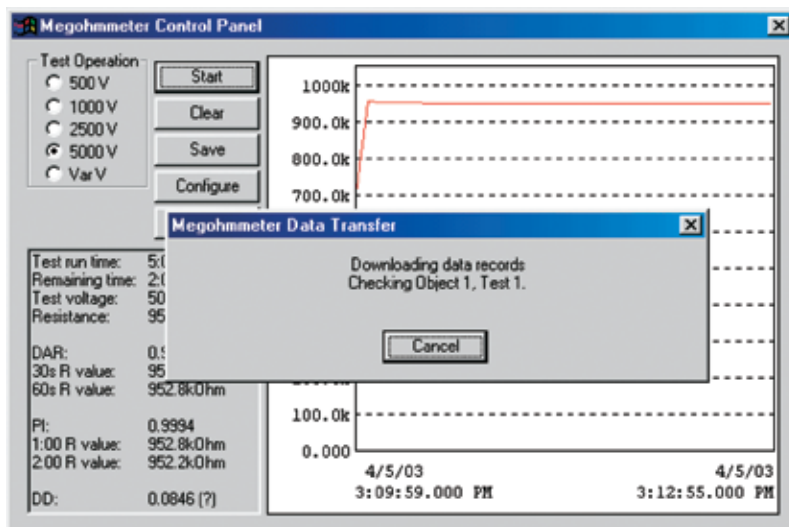
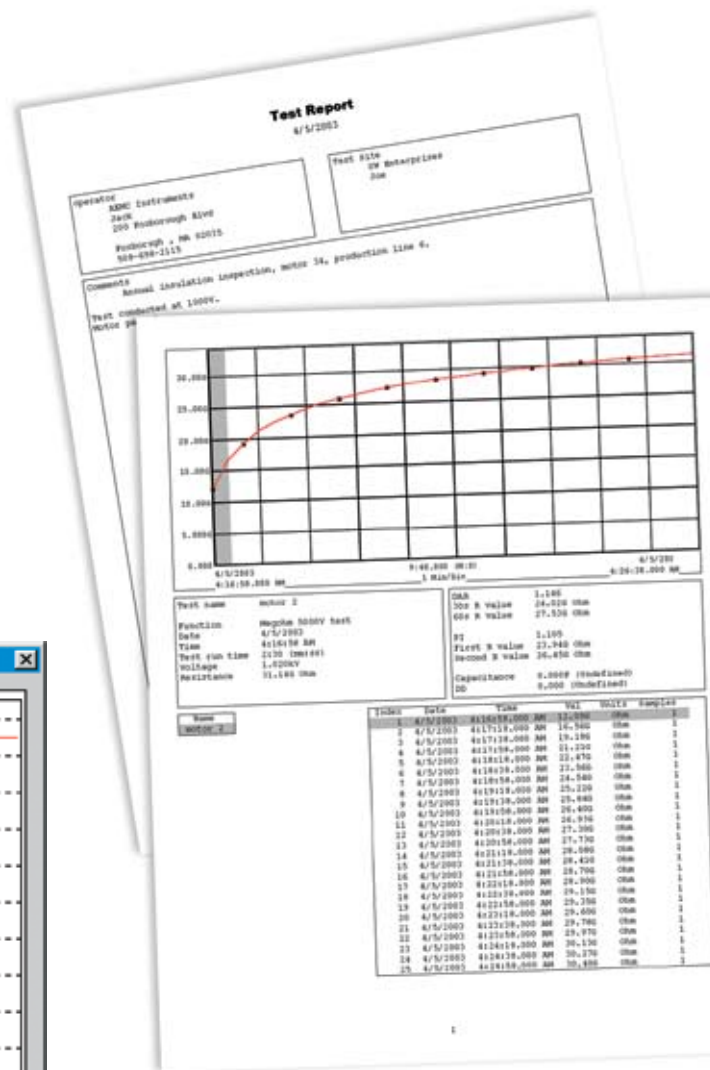
Test result status box displays complete test results in real time



Run test and display results from one dialog box.



Reports may be displayed on your PC and printed. Each report includes all test results in a tabular and graphic format, as well as operator and test site information. Comments typed in at time of storage will also be included.

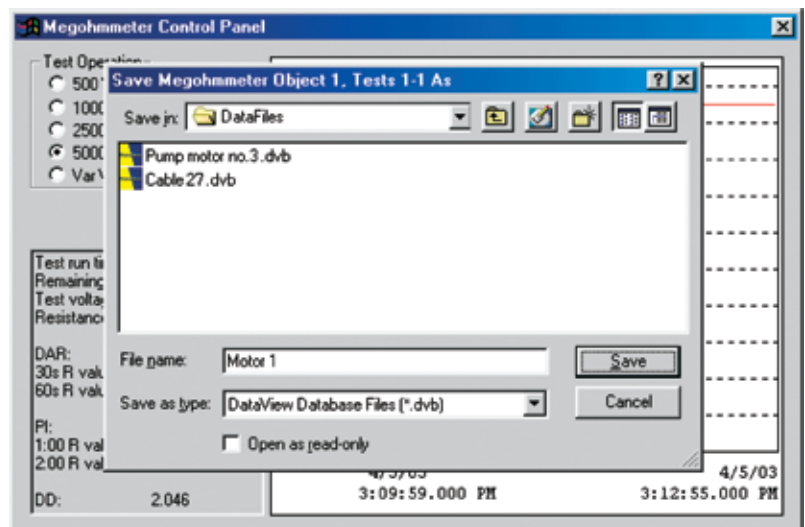


A simple press of the download button from either the setup or run dialog boxes will show all test results stored in the Models 5060 or 5070.

DataView[®]

Minimum System Requirements:

- Windows[®] 2000/XP/Vista
- 128MB of RAM for Windows[®] 2000 (256MB recommended)
- 256MB of RAM for Windows[®] XP
- 512MB of RAM for Windows[®] Vista
- 80MB of hard disk space (200MB recommended)
- CD-ROM Drive



Each test will be stored as its own file and may be given its own unique file name.

DataView® screens for Model 5070

Megohmmeter 5070 Setup

General Settings | Variable Voltages | Ramp Voltages | Temperature

Test Run Settings:
 Test run time: (0) 1:55 (hh:mm, 00:01 - 49:59)
 Sample interval R(t): 4.10 (m:ss, 00:10 - 10:00)

PI Settings:
 1st PI time: 1.00 (m:ss, 00:30 - 59:59)
 2nd PI time: 4.00 (m:ss, 00:30 - 59:59)

Test Voltage:
 M Ω · 500V: 550.0k 30k-2T Ω
 M Ω · 1000V: 1000k 100k-4T Ω
 M Ω · 2500V: 2.500M 300k-10T Ω
 M Ω · 5000V: 5.000M 300k-10T Ω

Alarm Set Points:
 550.0k 30k-2T Ω
 1000k 100k-4T Ω
 2.500M 300k-10T Ω
 5.000M 300k-10T Ω

Enable all test voltages: ☐

Maximum voltage: 5100 40-5100 V

Date Format:
☐ USA MM/DD/YYYY
☒ European DD/MM/YYYY

Buzzer:
☒ ON
☐ OFF

Auto Power OFF:
☐ ON
☒ OFF

Disturbance voltage limitation:
☒ 3%
☐ 10%
☐ 20%

Buttons: Write to Inst, Read from Inst, Save to Disk, Load from Disk, Defaults, Set Clock, Clear Memory, Download, Close, Help

Megohmmeter 5070 Setup

General Settings | Variable Voltages | Ramp Voltages | Temperature

Variable test voltage:
 M Ω · Variable voltage V1: 50 40-5100 V 50.00k 30k-10T Ω
 M Ω · Variable voltage V2: 100 40-5100 V 100.0k 30k-10T Ω
 M Ω · Variable voltage V3: 250 40-5100 V 250.0k 30k-10T Ω

Buttons: Write to Inst, Read from Inst, Save to Disk, Load from Disk, Defaults, Set Clock, Clear Memory, Download, Close, Help

Megohmmeter 5070 Setup

General Settings | Variable Voltages | Ramp Voltages | Temperature

Step	Voltage (40-5100 V)	Duration (h:m)	Voltage (40-5100 V)	Duration (h:m)	Voltage (40-5100 V)	Duration (h:m)
Step 1	50	0.01	100	0.01	1000	0.01
Step 2	150	0.01	300	0.01	2000	0.01
Step 3	275	0.01	500	0.01	3000	0.01
Step 4	300	0.01	700	0.01	4000	0.01
Step 5	400	0.01	900	0.01	5000	0.01

R(t) sample (m:ss): 0.55 0.10 0.10

Buttons: Write to Inst, Read from Inst, Save to Disk, Load from Disk, Defaults, Set Clock, Clear Memory, Download, Close, Help

Megohmmeter 5070 Setup

General Settings | Variable Voltages | Ramp Voltages | Temperature

Temperature unit:
☐ °F
☒ °C

Default probe temperature: 23 (-15 °C - 75 °C)
 R(t) reference temperature: 40 (-15 °C - 75 °C)
 ΔT for R/2: 10 (-15 °C - 75 °C)

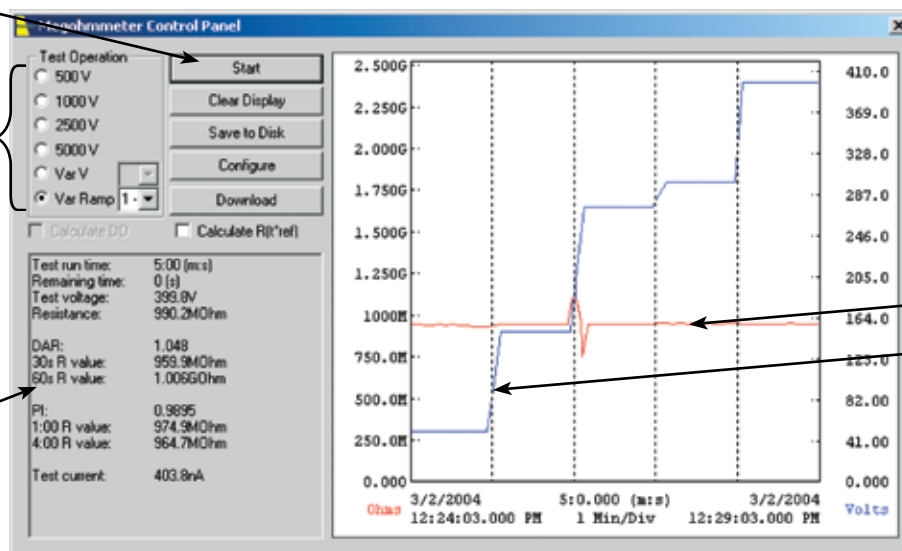
Buttons: Write to Inst, Read from Inst, Save to Disk, Load from Disk, Defaults, Set Clock, Clear Memory, Download, Close, Help

Four tabbed dialog boxes allow for clear and easy setup of all functions of the Model 5070, including setup for variable voltage and alarm set points, as well as step voltage tests and temperature compensation.

One button operation starts test and graphs results

Test voltage selection

Test result status box displays complete test results in real time



Graphic viewing of insulation resistance and step voltage during the test run

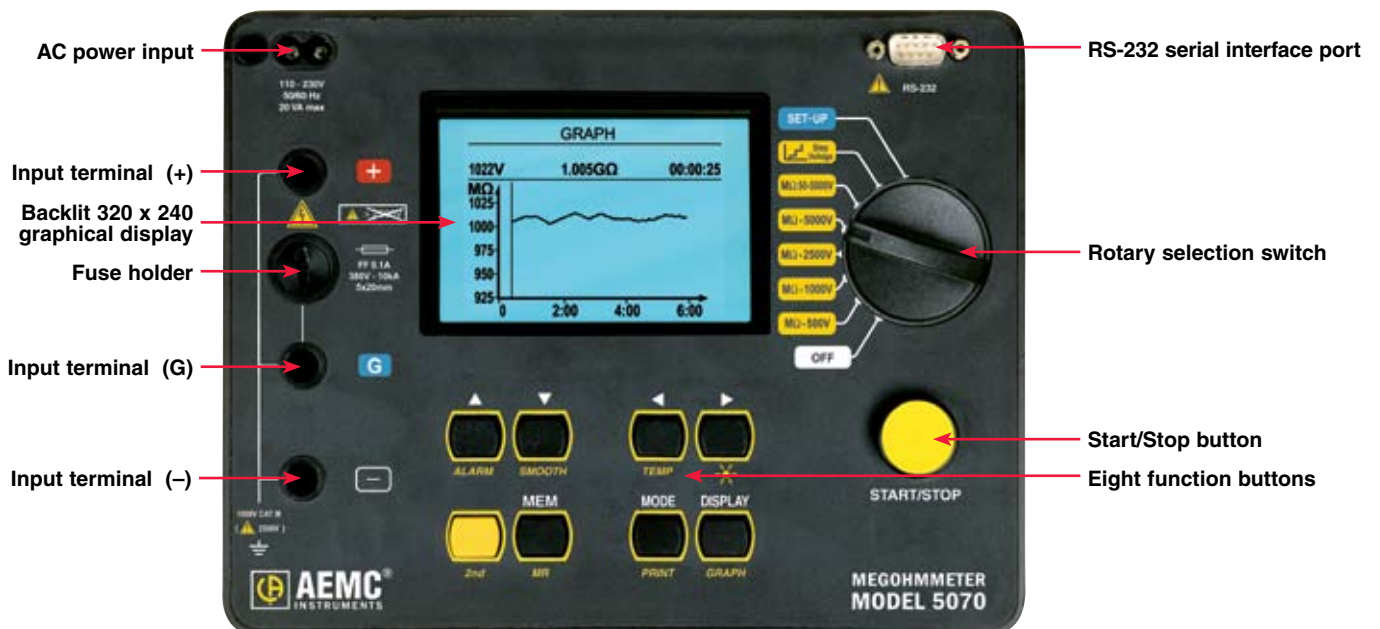
Run test and display results from one dialog box.

CONSTRUCTION

Models 5050 & 5060



Model 5070



ACCESSORIES

Models 5050, 5060 and 5070 include soft accessory bag with one red, one blue and one black lead with integral 5kV rated hippo clips, one jumper lead for use with guard terminal, rechargeable battery, US 120V power cord and user manual.



DataView® for
Models 5060 and 5070 (included)

Cable, PC RS-232, DB9 F/F 6 ft null modem
cable for Models 5060 and 5070 (included)

Optional 5000V Lead Set
Catalog #2119.55

ORDERING INFORMATION

CATALOG NO.

Megohmmeter Model 5050 (Digital, with Analog Bargraph, Backlight, Alarm, Timer, 500V, 1000V, 2500V, 5000V, Auto DAR/PI/DD)	Cat. #2130.20
Includes soft accessory bag, one red, one blue and one black lead with integral 5000V rated hippo clips, one jumper lead for use with guard terminal, rechargeable battery pack, US 120V power cord and user manual	
Megohmmeter Model 5060 (Digital, with Analog Bargraph, Backlight, Alarm, Timer, 500V, 1000V, 2500V, 5000V, Auto DAR/PI/DD, RS-232 w/DataView® Software)	Cat. #2130.21
Includes soft accessory bag, one red, one blue and one black lead with integral 5000V rated hippo clips, one jumper lead for use with guard terminal, one 5 ft RS-232 DB9/DB25 F/F to DB9/DB25 F/F Cable for PC, rechargeable battery pack, DataView® Software, US 120V power cord and user manual	
Megohmmeter Model 5070 (Digital, with Graphical Display, Backlight, Alarm, Timer, 500V, 1000V, 2500V, 5000V, Auto DAR/PI/DD, RS-232 w/DataView® Software)	Cat. #2130.30
Includes soft accessory bag, one red, one blue and one black lead with integral 5000V rated hippo clips, one jumper lead for use with guard terminal, one 5 ft RS-232 DB9/DB25 F/F to DB9/DB25 F/F Cable for PC, rechargeable battery pack, DataView® Software, US 120V power cord and user manual	
Accessories (Optional)	
Cable, PC RS-232, DB9 F/F 6 ft Null Modern Cable	Cat. #2119.46
Cable, PC RS-232, DB9 F/F 6 ft (for serial printer).	Cat. #2119.46
Leads, Set of three, 10 ft color-coded – rated at 5000V max (one red, one blue and one black lead: one red, one blue and one black alligator clip)	Cat. #2119.76
Leads, Set of three, 10 ft color-coded (one red, one blue and one black with integral 5000V rated hippo clips – Jumper lead not included)	Cat. #2119.76
Leads, Set of three, 25 ft color-coded – rated at 5000V max (one red, one blue and one black with integral 5000V rated hippo clips – Jumper lead not included)	Cat. #2119.86
Leads, Set of three, 45 ft color-coded – rated at 5000V max (one red, one blue and one black with integral 5000V rated hippo clips – Jumper lead not included)	Cat. #2119.87



Call the AEMC® Instruments Technical Assistance Hotline for immediate consultation with an applications engineer: **(800) 343-1391**

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